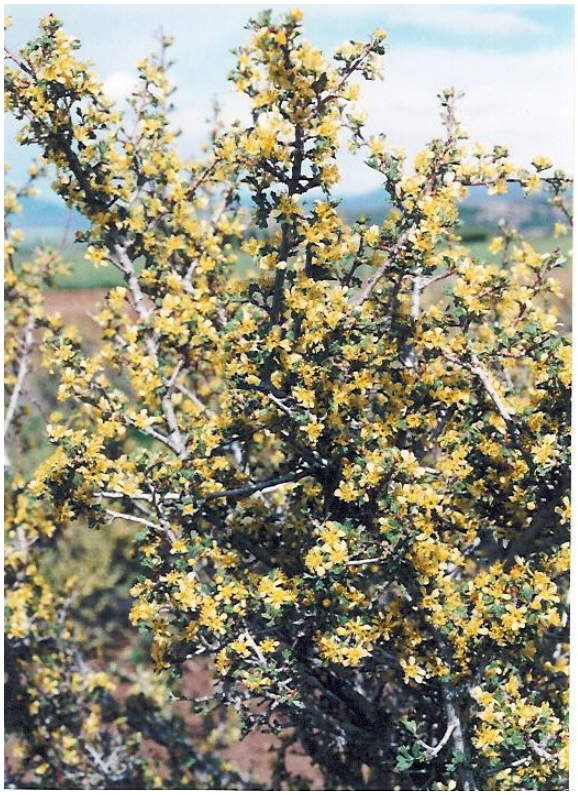
Plant Guide

ANTELOPE BITTERBRUSH

Purshia tridentate (Pursh) DC.

Plant Symbol = PUTR2

Contributed by: USDA NRCS California State Office and Lockeford Plant Materials Center, California Upper Colorado Environmental Plant Center, Colorado



Steve Parr, UCEPC, Meeker, Colorado

Alternate Names

Antelopebrush, buckbrush, quininebrush, bitterbrush, antelope-brush, quinine brush, deer-brush, black sage

Uses

Antelope bitterbrush is one of the most important palatable native shrubs in the western United States. It provides high quality, important spring and winter browse for domestic livestock, antelope, deer, and elk. Its seed is an important source of food for small animals and the plant provides cover for small animals and birds. It is considered medium quality coverage for sage-grouse. The shrub is also used for reclamation and erosion control of mined areas and has the potential for use as a living snow fence, roadside beautification, and xeriscape plantings.

Historic Native American Uses: Western Indian groups used leaf poultice or wash for itches, rashes, insect bites, chickenpox, and measles. Leaf tea was used as a general tonic and for colds, pneumonia, liver disease, to expel worms, and as an emetic and laxative for stomach ache and constipation. Twigs, leaves, and berries were used as a laxative. Root teas were used for coughs, lung and bronchial infections, fever, and to facilitate delivery of placenta.

Status

Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Description

General: Antelope bitterbrush is a slow growing shrub that is moderate to very deep rooted with wide ecotypic variations. It is normally 2 to 6 feet in height and up to 8 feet in width with wedge shaped, three lobed leaves (some are persistent in winter). Leaves can vary in color from grey green to bright green. Some plants have branches near the soil that layer (branches that touch the soil develop roots) providing additional rooting for the plant.

Flowering occurs in late spring to early summer. The spindle-shaped seed shatters easily at maturity. Flowers are small, varying from white to yellow, and produced profusely along each leader. The seeds are large for the species—15,500 per pound. They are about one-fourth inch long and obovate. Seeds, stems, and leaves are nontoxic.

Individual bitterbrush plants exhibit considerable variation for growth form. Bitterbrush's growth forms vary from a uniform, erect growth habit to more decumbent, layering forms. Users are encouraged to consider the various forms of bitterbrush in choosing a strain best suited to their needs.

Distribution: Antelope bitterbrush is an important native browse shrub in the intermountain Western United States. It occurs from New Mexico north to Colorado, Wyoming, Montana, and British Columbia, west to Idaho, and Washington, south to Oregon, California, and Nevada. For current distribution, please consult the Plant Profile page for

this species on the PLANTS Web site.

Habitat: Antelope bitterbrush occurs most often as part of a mixed shrub community, but occasionally is found in nearly pure stands. It is associated with a variety of understory grasses and forbs. It can also be an understory plant in association with taller growing trees.

Adaptation
Antelope bitterbrush is adapted to a wide range of soils with 8 to 34 inches of annual precipitation. It is normally found at elevations of 4000 to 8500 feet, but has been noted at 11,000 feet in California. The shrub has good tolerance to drought and cold.

In California, bitterbrush is associated with big sagebrush (*Artemisia tridentata*) and rabbitbrush (*Chrysothamnus* sp.). It occurs naturally on dry lake beds, alluvial fans or terraces, and low foothills. It occurs in soils that are deep, gravelly, loamy coarse sands derived from granite, with pH ranging from 6.0 to 7.0. Tests have shown that bitterbrush has high potential for use on deep, coarse, well-drained, neutral to slightly acidic soils in areas that have 12-24 inches of annual precipitation.

Establishment
Natural establishment of antelope bitterbrush occurs in years with good seed production when rodents cache seed and do not use all of the caches. Moisture is necessary the first few years of seedling growth for establishment. Late fall or winter seeding is recommended and competition can be a problem for establishment. Seeds should be drilled about 1 inch deep at a rate of 1/2 to 2 (3) pounds per acre. Rates are doubled if broadcasting and seeds do need to be covered. In California, pretreatment with hydrogen peroxide is required to break dormancy for spring seeding and seedlings are susceptible to late frosts.

Bitterbrush seedlings are often transplanted on critical sites. In such castes, moisture must be adequate to ensure survival in the first year. One-year-old bare-root or containerized seedling stock, 6 to 24 inches tall, is recommended.

Plants should not be used for the first four years and seedlings need protection until they are 8 to 10 inches tall. Rodents normally cache seeds within 50 to 75 feet of an existing seed source. Suitable environmental conditions may allow natural revegetation in only one out of 20 years. Antelope bitterbrush can also be established with tubling plants. These should be planted in the spring or early summer. Establishment can be slow; however, stands tend to be long-lived.

Several insects and diseases are known to damage the foliage, seed, and seedlings of bitterbrush, and are more or less susceptible than other species. High-density populations of grasshoppers can destroy seedlings.

Management
Since antelope bitterbrush is a very palatable shrub for big game and livestock, its use should be controlled or it can be easily eliminated by overuse. The shrub is most often used by big game in the fall, winter, or early spring when other plants are still covered by snow. Livestock tend to use the shrub during the growing season when use is more detrimental to vigor. Stands of bitterbrush can become decadent with no use and mature plants should be browsed for good forage production and vigor. However, no more that 50 to 60 percent of current annual growth should be removed. The literature indicates that bitterbrush is not a fire resistant shrub, but is fire dependent and light to moderate fires may enhance stands.

Pests and Potential Problems
Many species of insects and mites inhabit antelope bitterbrush, several of these are beneficial. It should be noted that bitterbrush is insect pollinated. Insects that cause problems include defoliators such as mountain mahogany loper and Western tussock moth. Some of the noted seed insects are bitterbrush seed midge, Say's stinkbug, dark bitterbrush leaf tier, and flower thrips. Large numbers of seedlings and small plants have been destroyed by cutworms and false wireworms. Diseases associated with bitterbrush include root rot, root and stem wilt, and root-stem canker. Seedlings have been damaged by damping off (a disease caused by fungi). A beneficial organism associated with antelope bitterbrush is the nitrogen-fixing endophyte *Frankia purshiae*.

Environmental Concerns
There are no known environmental concerns associated with antelope bitterbrush.

Seeds and Plant Production
In Colorado, seed may not be produced in wildland stands for 8 to 20 years depending on existing conditions. Browsing should be reduced to 30 percent or less to obtain good seed production. Seed may not be produced from mature plants when stressed from drought or late freezes. Seed can be collected by hand by shaking branches and allowing the seed to fall in hand held collectors. Seeds vary in size from

15,000 to 33,000 per pound and germination normally ranges from 85 to 95 percent. A cold moist stratification period of up to six weeks may be required to obtain good germination. Tublings can be grown in a greenhouse for planting in a period of six months to one year.

In California, mature seed must be harvested with 3 to 10 days of ripening because it shatters quickly after reaching maturity. Seed may be harvested into canvas hoppers or aluminum seed collection trays positioned under the shrubs prior to seed fall. Seed collection and orchard maintenance are simplified by the upright growth form.

A 3.6 to 3.6 m to 4.9 x 4.9 m (12 x12 ft to 16 x 16 ft) spacing is recommended for antelope bitterbrush seed orchards. Plants in wildland stands reach full seed production in 8 to 20 years. With appropriate cultural practices, this period may be reduced to about 5 years for seed orchards. Nine-year old shrubs grown at 2.4 m (8 ft) spacings without irrigation or other cultural treatments at the Boise Shrub Garden, produced 118 g (0.26 lbs) of seed per shrub or 199 kg/ha (177 lbs/acre).

Seed is easily cleaned to a purity of 95 percent using a two-screen fanning mill and a barley debearder. Shriveled black seed is nonviable and should be separated with the chaff. Seeds of bitterbrush are relatively large, averaging 34,507 seeds/kg (15,685 seeds/lb) for cleaned seed, with germination averaging about 84 percent. Seeds of bitterbrush remain viable for 15 years or more in open storage.

On rangeland sites antelope bitterbrush is normally seeded in late fall or winter to permit field stratification of the seed. Pretreatment with hydrogen peroxide is required to break dormancy for spring seeding. Seedlings are susceptible to late frosts. Plants develop very slowly and must be protected from competition during the first two seasons. Recommended seeding rates are 1.2 to 3.3 kg/ha (1 to 3 lbs/acre). Bitterbrush may be established on critical sites by transplanting.

Cultivars, Improved, and Selected Materials (and area of origin)

'Lassen' is a cultivar of antelope bitterbrush released in 1984 by USDA Forest Service, Shrub Sciences Laboratory, Provo, Utah, Soil Conservation Service, and Utah Division of Wildlife Resources, Ephraim Utah. Seven other agencies in California, Idaho, Nevada, and Oregon cooperated. Its origin is near Janesville in Lassen County, California.

Fountain Green germplasm is a source identified release of antelope bitterbrush. It was released in 1990 by the USDA Forest Service, Shrub Sciences Laboratory, Provo, Utah, and the Utah Division of Wildlife Resources, Ephraim, Utah. Its origin is North of Fountain Green, Utah.

Maybell germplasm was released in 1997 as a selected class release by Upper Colorado Environmental Plant Center. Five other agencies participated in the release. Maybell's origin is Moffat County in Northwest Colorado, near the town of Maybell.

References

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Release information for 'Lassen' and Maybell Select Class.

Prepared By

Dyer, Dave, USDA NRCS Plant Materials Center, Lockeford, CA and *Reina O'Beck,* California State Office, Davis, CA and *Gary L. Noller, Ph.D., Plant Materials Consultant,* Upper Colorado Environmental Plant Center, Meeker, Colorado

Species Coordinator
Dyer, Dave, USDA NRCS Plant Materials Center, Lockeford, CA.

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